

Amendment and Response

Applicant: Clyde M. Guest et al.

Serial No.: 09/848,479

Filed: May 3, 2001

Docket No.: A126.164.102 (Previously: B63814C-013377-0084)

Title: SYSTEM AND METHOD FOR SELECTION OF A REFERENCE DIE

REMARKS

The following remarks are made in response to the Final Office Action mailed April 26, 2004. In that Office Action, the Examiner objected to claim 98 under 37 C.F.R. §§1.75(a) and 1.75(d)(1) as failing particularly point out and distinctly claim the subject matter which the Applicant regards as the invention, and for failing to conform to the invention as set forth in the remainder of the specification.

Claims 73-98 were rejected under the judicially created Doctrine of Obviousness-Type Double Patenting as being unpatentable over claim 26 of Guest et al., U.S. Patent No. 6,252,981 ("Guest Parent Application").

Claims 73-75, 79-81, and 90-92 were rejected under 35 U.S.C. §102(e) as being anticipated by Sumie et al., U.S. Patent No. 5,943,437 ("Sumie").

Claims 90-92, and 98 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Sumie and Schemmel et al., U.S. Patent No. 5,943,551 ("Schemmel"). Claims 76, 82, 83, 86, 87, and 93 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Sumie and Miyazaki, U.S. Patent No. 6,031,607 ("Miyazaki"). Claim 98 was rejected under 35 U.S.C. §103(a) as being unpatentable over Sumie in view of Khalaj et al., U.S. Patent No. 5,513,275 ("Khalaj"). Claims 78, 96, and 97 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sumie in view of Berezin et al., U.S. Patent No. 5,539,752 ("Berezin"). Claims 76, 82-89, and 93 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sumie in view of Brecher et al., U.S. Patent No. 5,544,256 ("Brecher"). Claims 77, 94, and 95 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Sumie and Michael, U.S. Patent No. 5,640,200 ("Michael"). Claims 94 and 95 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Sumie and Schemmel as applied to claim 90 above, and further in combination with Michael.

With this Response, claims 73, 79, 90, and 98 have been amended. Claims 73-98 remain pending in the application and are presented for reconsideration and allowance.

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37 C.F.R. §1.75 Objection to Claim 98

The Examiner objected to claim 98 under 37 C.F.R. §§1.75(a) and (d)(1) as failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention, and for failing to conform to the invention as set forth in the remainder of the Specification. With this Amendment and Response, claim 98 has been amended to incorporate the changes suggested by the Examiner at pages 2-3 of the above-referenced Office Action. Therefore, it is believed that claim 98 meets the requirements of 37 C.F.R. §1.75, and as a result, withdrawal of the Examiner's objection on that basis is respectfully requested.

Double-Patenting Rejections

The Examiner rejected claims 73-98 under the Judicially created Doctrine of Obviousness-Type Double Patenting as being unpatentable over claims 1-26 of US Patent No. 6,252,981. A Terminal Disclaimer in compliance with 37 C.F.R. §1.321(c) has been appended to this Response in order to overcome the Examiner's rejection. As such, withdrawal of the Examiner's rejection on double patenting grounds is respectfully requested.

Support for Claim Amendments to Claims 73, 79 and 90

It is respectfully submitted that the amendments to claims 73, 79 and 90 are adequately supported by the Specification, and otherwise meet the statutory requirements for patentability. For example, at page 4, lines 12-17 of the Specification it is taught that one aspect of the present invention eliminates the need for an operator to manually view and select dies that would be used for comparison in determining a reference die. For further support, the Examiner may refer to page 7, lines 16-21; page 8, lines 10-17; and page 18, lines 17-23, for example.

Claim Rejections under 35 U.S.C. §§102(e) and 103(a)

Claims 73-75, 79-81, and 90-92 were rejected under 35 U.S.C. §102(e) as being anticipated by Sumie. Independent claim 73 as amended relates, in part, to a system for selection of a reference die image comprising: a die image comparator operable to create a difference image without a manually selected reference image, wherein the difference image is based upon

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a first die image and a second die image; and a difference image analysis system coupled to the die image comparator, operable to determine whether the first die image and the second die image may be used as the reference die image. For at least the reasons described below, the cited references fail to teach or suggest limitations of claim 73 as amended.

In particular, Sumie does not teach or suggest creating a difference image without a manually selected reference image as required by the limitations of claim 73 as amended. At column 7, lines 50-57 of Sumie (as cited by the Examiner at page 16 of the above-referenced Office Action) it is taught that “the reference image data ID_c [can be]... generated by applying image processing, ... based on design data... , or... data obtained by picking up an image of a portion of the surface... where there is no defect.” At page 17 of the Office Action, the Examiner indicates that Sumie at column 8, lines 46-60, discloses how to determine whether an image of a portion of the surface is without defect. In that passage, Sumie discloses that “a defect portion can be extracted by comparing the pieces of luminance information LI_1 , LI_2 of the dies with each other.” Sumie then indicates that “when the same part of three dies is extracted by the inventive method, if the pieces of luminance LI_1 , LI_2 substantially agree within a specified tolerance, no defect is determined to exist in the test regions of the three dies.” However, “if the pieces of luminance information LI_1 , LI_2 extracted from one die differ from those extracted from the remaining two dies, a defect exists in the test region of this one die.” From this, the Examiner concluded at page 17 of the Office Action, that Sumie teaches, “how defects in dies can be determined without an initial reference image, and how the positions of defective or non-defective areas can be determined.” (citing Sumie, column 9, lines 1-5 (“[A] position where no defect exists is further picked up to use as a reference image.”))

However, Sumie cannot teach a difference image without a manually selected reference image as required by the limitations of claim 73 as amended, because Sumie indicates that luminance information LI_1 , LI_2 is extracted for each die prior to comparing them. (Sumie, column 8, lines 46-60.) In particular, all embodiments of the “inventive method” for acquiring luminance information LI_1 , LI_2 require both an inspection image I_b and a pre-stored reference image I_c . (Sumie, for example, Figs. 8, 13, 16, 17, & 18.) Although Sumie discloses that a position determined to have no defect may be “further picked up to use as a reference image,”

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that occasion must always be associated somehow with a previously, manually selected reference image. In other words, under the inventive method of Sumie, one must first have a reference image to calculate LI_1 , LI_2 for each die prior to comparing LI_1 , LI_2 of the dies with each other in order to obtain a new reference image by “picking up an image of a portion of the surface... where there is no defect.” That new reference image will necessarily be associated with the manually selected reference image. Consequently, any difference image I_d created via comparison of the new reference image I_c with an inspection image I_b will be associated with the previous, manually selected reference image.

Thus, Sumie inherently fails to teach the limitations of claim 1 as amended because any difference image I_d depends from a manually selected reference image. In fact, failure to provide a “prestored reference image I_c ” (Sumie, column 7, lines 63-67) would defeat the functionality of the method of Sumie, because LI_1, LI_2 would no longer be capable of initial calculation. Thus, Sumie, in fact, teaches away from a comparator operable to create a difference image without a manually selected reference image, wherein the difference image is based upon a first die image and a second die image as required by the limitations of claim 73 as amended. In light of the above, it is believed that claim 73 as amended presents patentably distinct material from the reference cited against it.

Independent claims 79 and 90 as amended can be distinguished from the cited references similarly to claim 73 as amended. In particular, both claims 79 and 90 as amended relate, in part, to identification of a reference image without a manually selected reference image. Therefore, claim 90 is believed to present patentably distinct material from the cited reference for reasons similar to those described above in association with claim 73 as amended.

The Examiner rejected claims 76-78, 82-89, and 93-98 under 35 U.S.C. §103(a) as being unpatentable over Sumie and one or more of: Schemmel, Miyazaki, Khalaj, Berezin, Brecher, and Michael. As described above, Sumie does not teach or suggest the limitations of claims 73, 79, or 90 as amended. Indeed, Sumie must utilize a manually selected reference image to avoid changing Sumie’s principle of operation or defeat the functionality of “the inventive method” Sumie. MPEP §2145(X)(D). In other words, Sumie taken as a whole teaches away from such

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limitations as it would require abandonment of calculating LI_1, LI_2 as taught in Sumie's inventive method.

Even if Sumie didn't teach away from such limitations, none of the cited references teach or suggests the limitations of claims 73, 79 or 90 as previously-amended. As claims 77-78, 82-90 and 91-98 depend from those claims, they are also neither taught nor suggested by the cited references.

For example, Schemmel relates to acquisition of a random sample of die images to create a statistical die model or standardized die image, which is then compared to dies images on a silicon wafer to determine if the silicon dies have surface defects. Schemmel, column 1, lines 60-67 to column 2, lines 1-2.

Michael, relates to a difference image resulting from comparison of a test image and a golden template image. (Michael, column 3, lines 34-36.)

Miyazaki relates to obtaining a difference image from a difference between a detection image and reference images. (Miyazaki, column 3, lines 20-30.)

Khalaj relates to automated direct patterned wafer inspection wherein a technique utilizing a defect-free reference image for making comparison with an actual image acquires all its needed information from a single image. (Khalaj, abstract.)

Berezin does not relate to a difference image, but relates to storing a database of defects to facilitate classification. (Berezin, column 5, lines 46-66.)

Brecher only relates to a difference image based on an original image minus a golden template. (Office Action dated 4/26/04, page 13 and Brecher, column 13, lines 25-30.)

In light of the teachings of the cited references, independent claims 73, 79 and 90 as amended, as well as claims 74-78, 80-89 and 91-98 depending therefrom, are believed to present patentably distinct material from the cited references. As such, withdrawal of the Examiner's rejection of claims 73-98 is respectfully requested with allowance, and notification to that effect.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 73-98 are in form for allowance and are not taught or suggested by the cited references. Therefore,

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reconsideration and withdrawal of the rejections and allowance of claims 73-98 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(b)(c). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Respectfully submitted,

Clyde M. Guest et al.,

By his attorneys,

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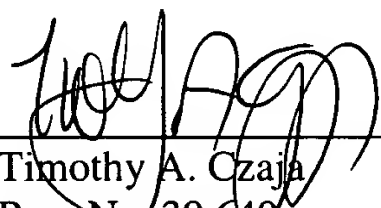
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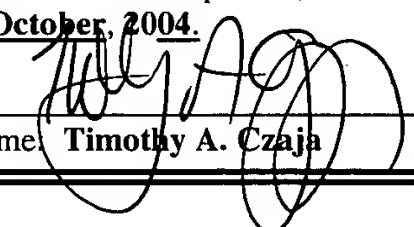
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CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 26th day of October, 2004.

By 
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